June 27, 1961 T. J. McMAHON 2,989,811

EDUCATION DEVICE FOR TEACHING DECIMALS AND FRACTIONS

Filed July 1, 1960 3 Sheets-Sheet 1

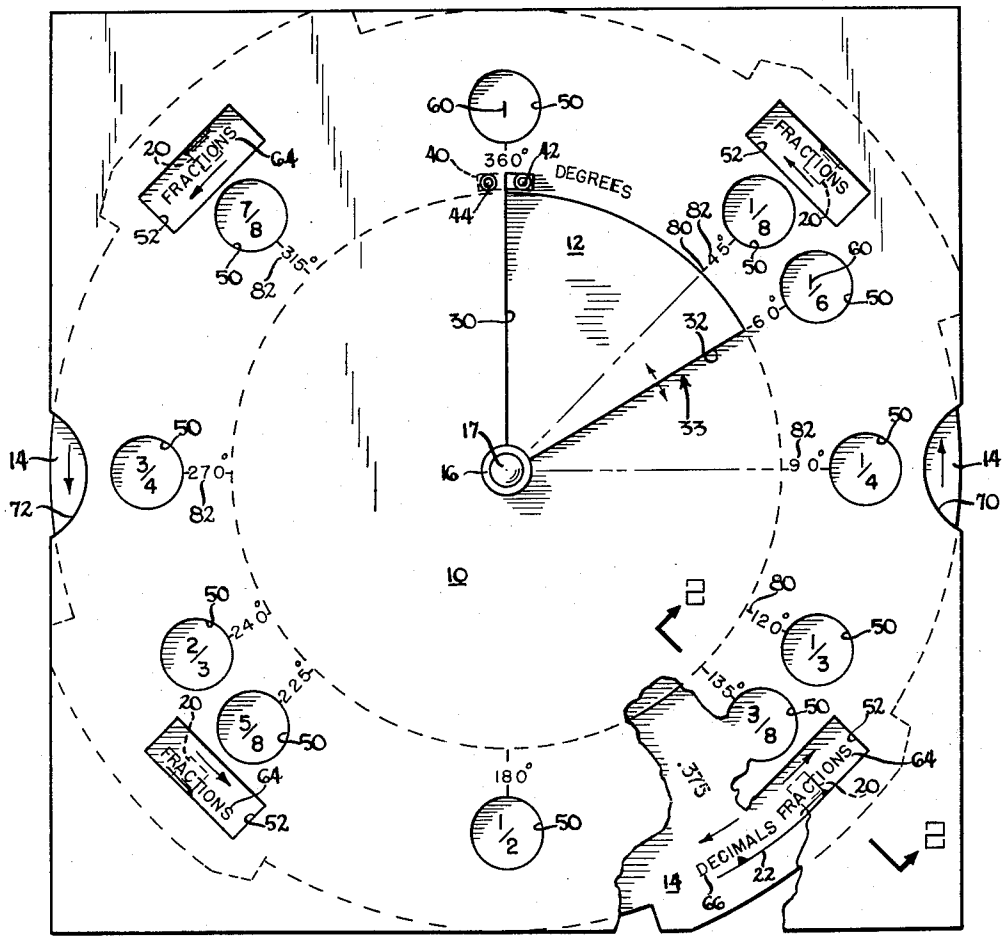


Fig. 1

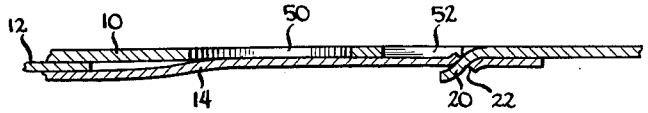


Fig. 2

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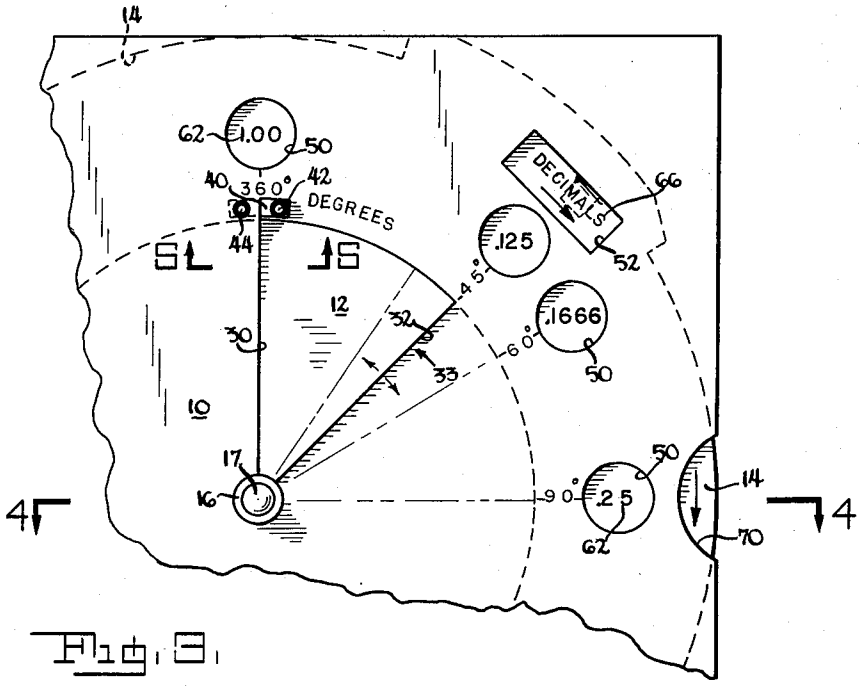


Fig. 3

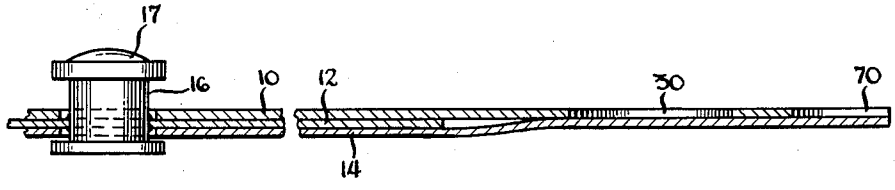


Fig. 4

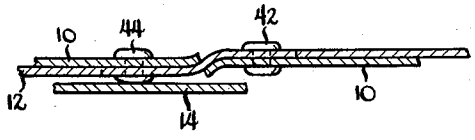


Fig. 5

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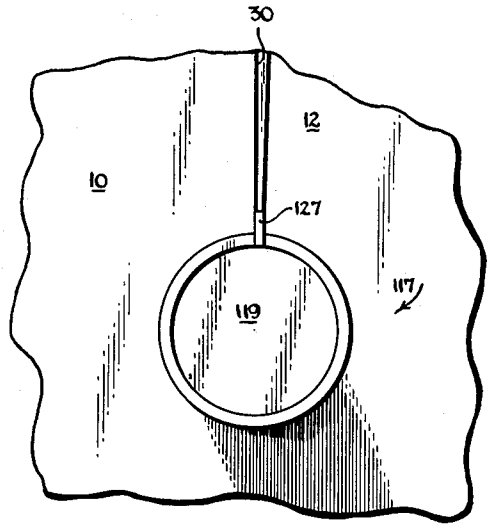


Fig. 6.

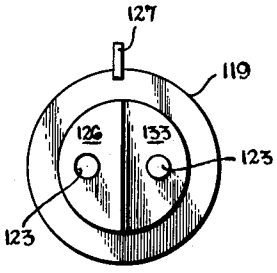


Fig. 7.

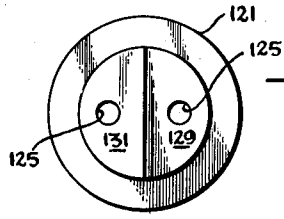
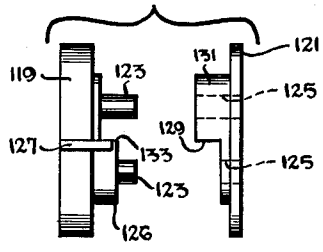


Fig. 8.

Fig. 8.



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EDUCATION DEVICE FOR TEACHING DECIMALS AND FRACTIONS

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Filed July 1, 1960, Ser. No. 40,428
2 Claims. (Cl. 35—74)

The present invention relates to new and useful improvements in a device for teaching fractional and decimal arithmetic in a simple and appealing manner.

It is a principal object hereof to provide a training aid whereby the relationship between various fractions and decimals can be readily demonstrated, the components of the device being readily shiftable for purposes of permitting the ready identification of particular fractions or decimals which it is desired to teach.

It is another object hereof to provide a training device which may be readily used to demonstrate fractional arithmetic and decimal arithmetic, and also the plane geometry of circles and their sectors, which training device is durable, simple in construction, economical in manufacture, and highly efficient and serviceable in use.

Many children find it exceedingly difficult to acquire abstract knowledge. In the simple exercises in arithmetic, for instance, there is the omnipresent problem of making same attractive to a child and making same conducive to concentration.

Accordingly, it is a salient object of my invention to associate mathematical problems with some interesting and appropriate pictorial matter, so that the student's mind will be alert and eager and so that the student will give the project his wholehearted and spontaneous cooperation.

As a further refinement, I provide an attractive self-instruction device by means of which the student may instruct himself with the usual danger of error incident to self-instruction eliminated.

It is another object to provide a cheap, durable device which occupies little space and one wherein the parts of same will not become easily separated and lost.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description and the accompanying drawings wherein:

FIG. 1 is a top plan view of a preferred form of the device comprising the present invention;

FIG. 2 is a sectional view on the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary top plan view of the device shown in FIG. 1 in an adjusted position;

FIG. 4 is a sectional view on the line 4—4 of FIG. 3;

FIG. 5 is a sectional view on the line 5—5 of FIG. 3;

FIG. 6 is a partial top plan view of a modified rotative means whereby the primary disc may be rotated relative to the front panel means of the invention;

FIGS. 7 and 8 are top plan views of the two segments of the rotative means shown in FIG. 6; and

FIG. 9 is an exploded view showing the relative positions of the segments of FIGS. 7 and 8 immediately prior to assembly thereof.

With continued reference to the drawings wherein, for the purpose of illustration, like numerals designate like parts throughout the same, the calculator device hereof includes a front panel **10**, a primary disc **12**, a secondary disc **14**, and a ring rivet **16** having a manually engageable forwardly extending portion **17**.

The front panel **10** is preferably made from a single sheet of cardboard, thermoplastic, plastic, sheet metal or other similar material.

Primary disc **12** is centrally and rotatably secured to the front panel adjacent to and rearwardly thereof as by the rivet **16**. Secondary disc **14** is of greater diameter than primary disc **12** and is also centrally and rotatably

secured to the front panel and rearwardly thereof and adjacent the primary disc **12** by said rivet **16**.

Primary and secondary discs **12** and **14** are preferably made from a single sheet of carboard, thermoplastic, plastic, sheet metal or equivalent material.

The outer periphery of secondary disc **14** may be movably engaged with front panel **10** by means of depressible tab or tongue portions **20** which may be provided in front panel **10** and may have free outer ends which may be depressed and inserted into and through suitably located complemental arcuate slots **22** provided adjacent the peripheral edge of secondary disc **14**. Said slots **22** are of such length as to permit the shifting rotation of secondary disc **14** relative to front panel **10** between two positions, identified as a primary position and a secondary position, for purposes presently to be observed, and to limit the rotative movement of the said secondary disc to between said positions. See FIG. 2.

Front panel **10** is provided with a slot **30** extending therethrough along a portion of a radius from the center of the panel adjacent rivet **16** through a length slightly in excess of the dimension of the radius of primary disc **12**.

Primary disc **12** is also provided with a slot **32** extending therethrough along a radius from the center of the disc adjacent rivet **16**.

Front panel **10** may be provided with a spacer **40** which is fixed to the forward face of the panel as by a rivet **42** at one side of the outer extremity of slot **30** and which is fixed to the rearward face of the panel as by a rivet **44** at the opposite side of the outer extremity of slot **30**, said spacer **40** being of such thickness as to provide an enlarged opening at the slot by virtue of the disposition of the horizontal plane of front panel **10** at one side of slot **30** forwardly of or outwardly of the horizontal plane of front panel **10** at the other side of slot **30**.

Primary disc **12** may be rotated relative to front panel **10** by means of manual engagement of portion **17** of the ring rivet.

The leading edge **33** of slot **32** of primary disc **12** is thus introduced through slot **30** of front panel **10** so that primary disc **12**, or at least a portion thereof, may be rotated so as to overlie the forward face of front panel **10**, in manner as will presently be observed.

As primary disc **12** is rotated in a clockwise direction, following the introduction of the said leading edge **33** of the slotted primary disc through slot **30** of the front panel, the primary disc is actuated so as to overlie a portion of the forward face of front panel **10** in any desired degree or to any desired extent, according to the training purpose.

Continued rotation of primary disc **12** in the clockwise direction will result in the entirety of primary disc **12** being disposed forwardly of front panel **10**.

Continued rotation of primary disc **12** in a counterclockwise direction will result in the positioning of the primary disc behind the front panel.

Front panel **10** is provided with a plurality of openings **50** therethrough which are arranged in an annular ring around rivet **16** and another plurality of openings **52** therethrough which are arranged in a secondary annular ring around rivet **16** and outside of the ring of openings **50**, all in manner to overlie secondary disc **14**.

Openings **50** and **52** are adapted to expose or to cover respective series of indicia.

An annular ring of indicia **60**, representative of the fractions such as "⅛," "⅙," "¼," "⅓," "⅜," "½," etc., is delineated in seriatim upon the upper face of secondary disc **14** in manner so as to register with openings **50** in the primary or "fraction" position of the secondary disc relative to the front panel, as shown in FIG. 1.

Another series of indicia **62**, representative of the decimal equivalents of the said delineated fractions such as ".125," ".1666," ".25," etc., is dilineated in seriatim upon the upper face of secondary disc **14** in the annular ring defined by indicia **60** in manner to alternate therewith so as to register with openings **50** in the secondary or "decimal" position of the secondary disc relative to the front panel, as shown in FIG. 3.

An annular ring of indicia **64**, delineating the word "Fractions," is impressed upon the upper face of secondary disc **14** in manner to register with openings **52** in the said primary or "fraction" position of the secondary disc relative to the front panel, as shown in FIG. 1.

Annular ring of indicia **66**, delineating the word "Decimals," is impressed upon the upper face of secondary disc **14** in manner to register with openings **52** in the said secondary or "decimals" position of the secondary disc relative to the front panel, as shown in FIG. 3.

Additionally, front panel is provided with a recessed portion **70** at one peripheral edge and a similar recessed portion **72** at the opposite peripheral edge to expose the periphery of secondary disc **14** for the rotation thereof relative to front panel **10**.

As secondary disc **14** is rotated by engagement of the peripheral edge portion thereof extending through recess **70** or recess **72** in the front panel, it may be moved between a primary or "fraction" position where the delineated fractions **60** appear through front panel openings **50** and the delineated words "Fractions" **64** appear through front panel openings **52**, and a secondary or "decimal" position where the delineated decimals **62** appear through front panel openings **50** and the delineated words "Decimals" **66** appear through front panel openings **52**.

To aid in operation of the device, primary disc **12** may be rotated to permit its said leading edge **33** to be stopped adjacent a tick mark **80** centrally opposite one of the openings **50**.

If desired, primary disc **12** may be of a contrasting color so as to more dramatically illustrate the representation.

By inspection, when the leading edge of primary disc **12** is brought to tick mark **80** opposite opening **50** representative of the fraction "¼" or the decimal ".250," for example, the student will see that the sector of the primary disc disposed forwardly of front panel **10** and therefore visible is one-fourth of the entire primary panel.

Preferentially, adjacent the tick marks **80**, indicia **82** may be imposed delineating the correct angle in degrees, as for example "45°" at the window representative of the fraction "¼" or the decimal ".250."

The various combinations in which the several sets of information may be used coincidentally will be readily perceived by the reader, it being appreciated that fractions or percentages, decimal arithmetic, and the plane geometry of circles may be demonstrated through the use of the apparatus herein disclosed.

In FIGS. 6–9 inclusive, I have shown a modified interlocking rotative means generally designated by the numeral **117** comprised of a manually engageable knob member **119**, and a base member **121**.

The knob member **119** is preferably annular in shape and is provided with a pair of transversely extending pins **123**, said pins being fixed to the rearward face thereof and extending outwardly therefrom, as indicated in FIGS. 7 and 9.

Base member **121**, which is also preferably annular in shape, is suitably perforated as at **125** to receive the transverse pins **123** of knob **119**.

A stop member **127** is fixed to the outer periphery of knob **119** and extends outwardly therefrom. Upon counter-clockwise rotation of the knob **119**, when the inner vertical edge of said stop member contacts the vertical edge of slot **30**, further rotation of the primary disc is prevented.

The rearward face of knob **119** may be interlocked with the forward face of base member **121** upon insertion of the pins **123** of the knob into the perforations **125** of the base.

Continued inward pressure upon each of the members **119** and **121** causes the laterally outwardly extending protrusion **126** of the knob **119** to interlock with a corresponding detent **129** in the face of the base **121**, while a protrusion **131** extending laterally outwardly from the face of the base **125** simultaneously interlocks with a corresponding detent **133** in the rearward surface of the knob **119**.

It will be understood that the protrusions extending laterally outwardly from the knob **119** and the base **121** are each circumferential in shape and are each of a smaller diameter than the diameters of said knob and base.

It is contemplated that the front panel **10**, primary disc **12** and secondary disc **14** of the invention will be suitably perforated to receive the pins **123** of the knob **117**.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

What I claim is:

1. In an educational device for graphically portraying the relationship between fractions or percentages, decimal arithmetic, and the plane geometry of circles, comprising, a front panel, a primary disc, a secondary disc, means connecting said discs to said panel centrally thereof in manner to permit rotative movement of said discs relative to said front panel, said front panel having a first series of circumferentially disposed apertures provided therein adjacent the peripheral edges thereof and having a second series of circumferentially disposed apertures provided therein adjacent said first series of apertures, said secondary disc having a first annular ring of indicia representative of fractions and their decimal equivalents delineated in seriatim on the face thereof and visible through the first series of apertures in said front panel and having a second annular ring of indicia delineated thereon adjacent said first ring and visible through the second series of apertures in said front panel, said secondary disc being movable for moving the indicia into and out of coincidence with said apertures, said front panel and said primary disc being radially slotted whereby a portion of said primary disc may be rotated from a position rearwardly of said front panel to a superposed exposed position forwardly of said front panel whereby the relationship between the plane geometry of the arc depicted by the sectoral exposed portion of said primary disc may be related to the correlative fractional or decimal equivalents delineated on said secondary disc and visible through the circumferentially disposed apertures in said front panel.

2. In an educational device as set forth in claim 1, wherein certain of said first and second series of indicia delineated on said secondary disc is visible through said first and second series of apertures in said front panel as said secondary disc is moved to a relative primary position, and the other indicia of said first and second series is visible through said apertures upon movement of said secondary disc to a relative secondary position.

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